

TOWARD A THEORY OF
VERTICAL MARKET BEHAVIOR

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ABSTRACT

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Toward a Theory of Vertical Market Behavior

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The obliteration of previously distinct horizontal markets for agricultural commodities has focused increasing attention on vertical coordination in commodity subsectors. No accepted conceptual framework for analyzing vertical market processes exists. A subset of structure-conduct variables relevant to vertical market organization and behavior is suggested. Testable hypotheses are generated.

Key Words: Vertical Coordination, Market Behavior, Market Organization

TOWARD A THEORY OF VERTICAL MARKET BEHAVIOR

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My purpose is to suggest some elements of what might evolve into an improved theoretical understanding of vertical behavior in market systems. These ideas have evolved from my search for a conceptual framework within which the process of vertical coordination in agricultural commodity subsectors can be analyzed. That we are begging such a framework is clear from much of the work that has been completed to date by members of the vertical coordination subcommittee of NC-117, the Committee on the Organization and Control of the U.S. Food Production and Distribution System (see Marion, 1975 A, for example).

There are several compelling reasons to develop an improved theoretical explanation of vertical market behavior. Most theoretical attention to market processes in the past has been directed primarily to horizontal markets, that is, the organization and behavior of competing sellers or buyers of similar products. However, the increasing incidence of common ownership of several vertically tangent processes, various types of contractual arrangements, and other forms of vertical integration in agricultural commodity subsectors has in many cases obliterated previously distinct horizontal markets. The demise of the live broiler market provides a well worn example. As the incidence of distinct horizontal markets in agricultural subsectors declines, likewise the relevance of a theory of horizontal markets diminishes. The increasing concern with vertical coordination is a manifestation of

this phenomenon.

If we are to effectively study and analyze contemporary market problems in agriculture, an emphasis on vertical coordination and behavior is mandatory. Such analysis requires some conceptual framework, at least to serve as a basis from which to generate a meaningfully interrelated set of questions to answer, or hypotheses to test. Furthermore, such a conceptual framework enhances the probability that the efforts of relatively autonomous market researchers will have some additive quality, at least in terms of improving our collective understanding of vertical market processes.

As I present my conceptual framework I want to lift up three questions: 1) Is the basic theoretical framework logically constructed and intuitively appealing? 2) Are the suggested parameters relevant to an improved explanation of vertical behavior in agricultural markets? And 3) what additional parameters should be added to provide a more comprehensive basis for understanding and analyzing vertical market behavior?

THE ESSENCE OF THE CONCEPT

Quite simply, and borrowing heavily from market structure analysis, my thesis is this: there exists a tractable set of functional interrelationships among elements of the vertical structure of markets, various coordinating practices, and economic performance.

Obviously, the genesis for this thesis is the structure-conduct-performance framework of industrial organization theory. However, mine

is an attempt to substantially broaden that framework, to expand its scope to include vertical as well as horizontal market phenomena. In essence, I am suggesting that there is a subset of structure and conduct variables in markets that has to do with vertical coordination and other vertical processes, whereas the subset of structure and conduct variables that has received most attention by market economists has had to do primarily with horizontal market phenomena.

These are not mutually exclusive subsets of variables. However, some variables are more relevant to vertical analysis than to horizontal analysis, and vice versa. Furthermore, I suggest that the nature of the functional interrelationships among variables in each subset is somewhat unique. That is, we should learn more about total market behavior by examining both subsets rather than one. Heretofore, the vertical subset has received relatively little attention.

Vertical Market Structure

This thesis is predicated on the observation that markets have vertical structures in addition to the horizontal structures that have been of long term interest to economists. The vertical structure ties together buyers and sellers in a market. This is not unlike what those in the marketing discipline call a marketing channel. In fact, Baligh and Richartz equate the two [p. 1]. I think Baligh and Richartz are on the right track, but a bit narrow in focus. A marketing channel is generally considered to be "the pipeline through which a product flows on its way to the consumer" [Clewett, 1961]. However,

in many cases there exists more than one channel, or parallel market channels, between buyers and sellers of a common product -- alternative routes that a product can take in moving from an original seller to an ultimate user. Handy and Padberg, for example, have illustrated the existence of parallel systems, or channels, in the food manufacturing/distribution/retailing complex.

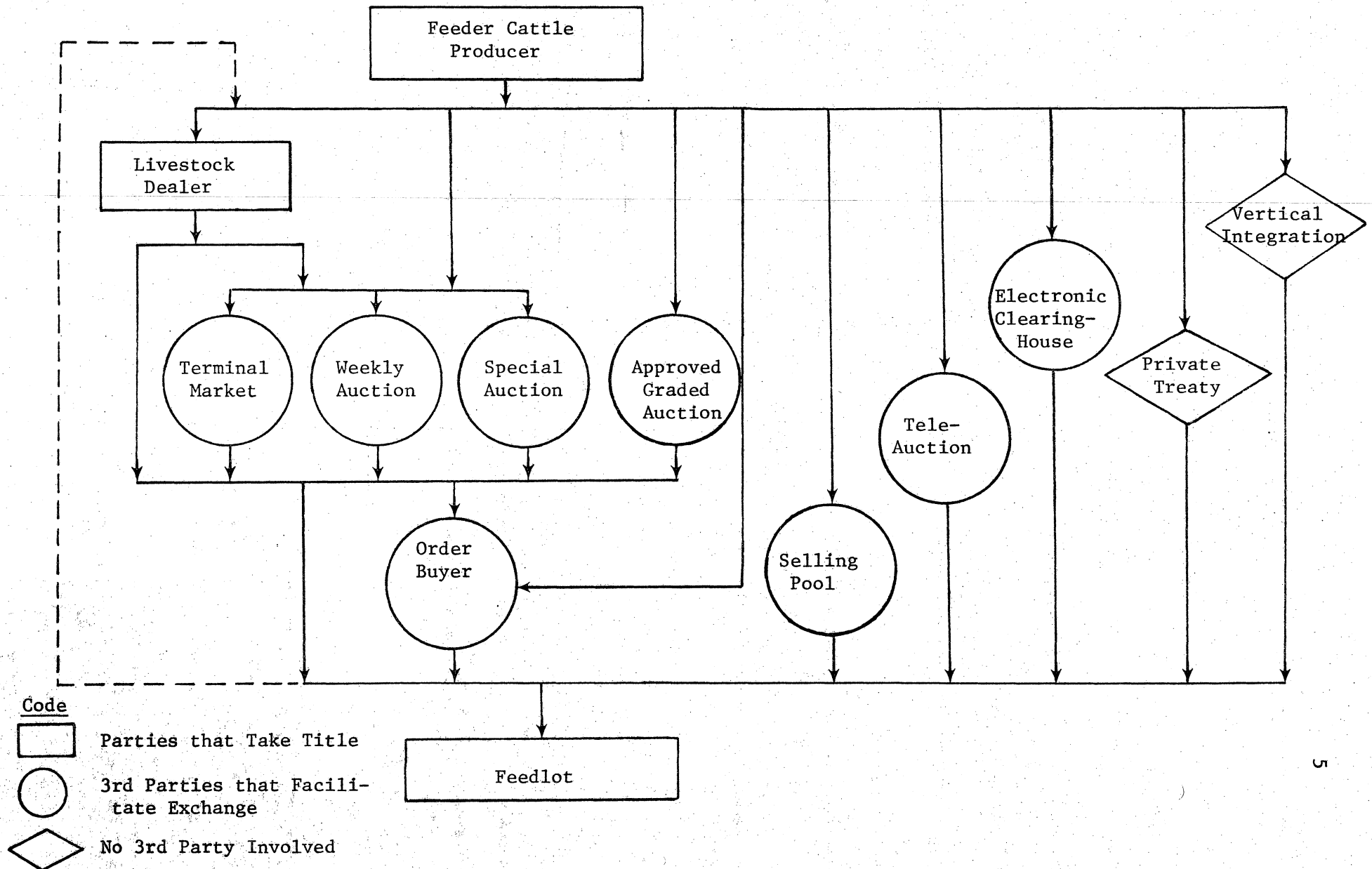
The vertical market structure can be viewed as the aggregate of all units or components that exist in all possible channels between sellers and buyers in a market. To help clarify this concept, a pictorial representation of the vertical structure to the feeder cattle market is presented in Figure I. While this may not include all relevant units, and obviously includes elements of historic, current and perhaps future importance, it does illustrate that several alternative channels can exist in a given vertical structure. Furthermore, it is clear that there are considerable differences among alternatives, varying from those that are short and relatively simple to those that are long and complex, containing several intermediate units.

This view of vertical market structure helps focus on some of the elements that may be relevant parts of the vertical subset of structural variables. Some such variables that appear to be relevant include:

1. The absolute number of buyers
2. The absolute number of sellers
3. The number of parallel channels that exist in a market
4. The number of intermediate units that exist in a market

FIGURE I

VERTICAL STRUCTURE OF THE FEEDER CATTLE MARKET



channel, or the length of the channel

5. The perishability of the product

6. The number of stages that exist in a commodity subsector^{1/}

This is not an exhaustive list of structural variables relevant to vertical market analysis. It is illustrative of the type of variable that may lead to tractable interrelationships with conduct and performance. Following brief discussions of vertical conduct, price and performance, I suggest some hypothetical relationships among these variables that are both logically appealing and, I believe, testable.

Vertical Market Conduct

Market conduct in the vertical context is a quite different concept than in the more generally received horizontal view. Conduct, in the industrial organization sense, is the nature of the competitive activities among sellers or buyers. As such, these are the activities of competitors, or, as Arthur has stated, the activities of "all those who come into the market place with similar wares to offer. It (competition) refers to a group, standing on one side of the market, each of whose members seeks to be choosen (original emphasis) by a prospective partner from the other side of the market at the expense of his fellows" [p. 7].

The subset of conduct variables that appears most relevant to vertical analysis focuses primarily on coordinating activities between buyers and sellers rather than on competing activities among buyers or sellers. Essentially, this is the process of trading options back and

forth between buyers and sellers until a mutually acceptable agreement, or stalemate, is reached. Arthur refers to this as bargaining, or the process of "negotiating, comparing, making choices, and arriving at an agreement with a partner - a supplier or a customer - who himself has been negotiating, comparing and making choices" [p. 7].

It is through this process that the competitive activities of sellers are coordinated with the competitive activities of buyers. This is the process of coordinating vertical relationships in a market.^{2/} Coordinating practices, therefore, appear to be important elements of the vertical subset of conduct variables. Certainly competitive activities, such as coercion or discrimination, affect vertical relationships, but I believe that the impact of such competitive practices is relatively well understood. The interrelationships between coordinating practices, market structure and performance are less clear.

Marion has presented a seemingly viable array of coordinating practices generally evidenced in agricultural subsectors [1975 B]. These prescribe the framework within which most vertical market activity is conducted, ranging from spot-transactions, or open production in Marion's terminology, through an array of increasingly specific contractual arrangements to vertical integration through common ownership, or, in Marion's terms, administrative production.

It seems useful to arrange such practices on a continuum ordered by the degree to which the relationship between the buyer and seller is prespecified on a long term basis. Ranging from least to most

specific, these coordinating practices include:

1. Spot transactions
2. Contract consumated after production decision
 - a. Price formula, no product (quality and/or quantity) specifications
 - b. Market contract with price formula and product specifications
 - c. Market contract with product and price specifications
3. Contract consumated prior to production decision
 - a. Market specification contract
 - b. Production specification contract
 - c. Resource providing contract
 - d. Services contract
4. Vertical integration through common ownership.

In general, certain types of coordinating practices seem to be used in conjunction with specific structural elements, e.g., spot transactions with local buying stations and teleauctions. However, these should not be viewed as firm relationships. Market contracts between local grain elevators (buying stations) and farmers provide one example. Teleauction-type exchange of market contracts provide another. This implies that both structural and behavioral variables are necessary to an understanding of the performance consequences of vertical processes in markets.

Price

In our generally received theory, price is delegated several critical functions. Primary among these is its role as a rationing device -- the guide to resource allocation. This so dominates our thinking that we frequently find "pricing efficiency" erroneously being used as synonymous with allocative efficiency. However, price is not essential, nor even necessary, for making allocative decisions. The second major function of price is score-keeping, determining the relative and absolute earnings of the various participants in the market. That is, rewards to economic activity are divided among participants through the system of prices.

Prices exist in almost any imaginable vertical economic system. Transfer prices in vertically integrated firms provide an example at the administrative extreme. But, the function of price is different among the various coordinating practices. At the "open" extreme, in spot transactions, price performs both the primary allocative and score-keeping functions. However, as we move across the continuum toward increasingly specific coordinating practices, allocative decisions become increasingly administered and the allocative role of price diminishes. At the administrative extreme, the score-keeping role of price appears to be much more important than its allocative function.

Performance

There is little difference in the concept of market performance

when viewed from either the vertical or horizontal perspective. This is generally comparable to economic performance -- that long shopping list of socially desirable ends to the economic process. In market analysis this normally encompasses technical efficiency, allocative accuracy,^{3/} progressiveness and equity, although it is not limited to these dimensions.

Technical efficiency is a well-researched concept and I'll not elaborate it further, although I have discussed this and two other concepts, allocative accuracy and equity, more fully elsewhere [Henderson, 1975]. Allocative accuracy refers to the "goodness" of the match between what sellers want to or do sell and what buyers want to or do buy. As such, this may be the singularly most important performance dimension associated with vertical coordination. This has both quantitative and qualitative dimensions. Purcell's research in the beef subsector focuses attention on both of these dimensions, i.e. the coordination (or lack thereof) of the quantity (through time) and the quality of cattle moving between various stages of the beef subsector.

The extent to which product quantity is misallocated may be reflected in the degree of stability or instability in the flow from one stage to the next over time. That is, the degree of quantitative allocative inaccuracy may be approximated by the variance in quantity flow over time from some measure of central tendency. With regard to the qualitative dimension, Purcell has used a "mirror image" approach using written and pictorial descriptions to compare quality rankings of

buyers and sellers. Using that approach, the extent of qualitative allocative inaccuracy may be approximated by measuring the variance between quality rankings of buyers and sellers.

The other performance dimensions, progressiveness and equity, are more difficult to handle, both conceptually and empirically. In general, progressiveness has to do with the rate at which new techniques and/or products are developed and/or adopted. Few, if any, workable measures of this have been developed, and I have none to offer. However, I suggest that the lack of relatively rapid adoption of product and/or process innovations can stand as evidence of the lack of progressiveness.

Equity is a complex concept, being generally concerned with both the level and the distribution of wealth and income. One aspect of this is equating a person's return for his economic activity with his contribution to the economic process, or, in neoclassical marginal economics, equating a person's wage rate with the marginal value of the product resulting from his labor.^{4/} His payment is in terms of price. Under or over pricing his services results in excess profits or losses to other participants in the market. Thus, the existence of excess profits or losses by some market participants may stand as partial evidence of inequity. Clearly, this is not a comprehensive measure, but perhaps useable.

THE USE OF THE CONCEPT

I present the above as a basis for a viable conceptual framework

for analysis of vertical market phenomena. A number of seemingly testable hypotheses can be pried from this framework. These include:

- H₁ : As the absolute number of buyers or sellers or both declines in two vertically tangent stages of a market, the types of coordinating practices used move away from spot-type transactions toward increasingly specific agreements.
- H₂ : The greater the number of parallel channels that exist in a vertical market structure, the greater the array and range of coordinating practices used.
- H₃ : The greater the number of intermediate units that exist in a vertical channel (or the longer the channel), the greater the use of coordinating practices toward the spot transaction end of the range.
- H₄ : The greater the perishability of product, the greater the use of coordinating practices toward the administrative, or highly specific agreement, end of the range.
- H₅ : The greater the number of intermediate units that exist in a vertical channel, the greater the technical inefficiencies in that channel.
- H₆ : The further that the coordinating practice moves away from the spot-type transaction and toward a highly specific agreement, the greater the technical efficiencies that result.

- H₇ : The further that the coordinating practice moves away from the spot-type transaction, the greater the allocative accuracy in both quantitative and qualitative terms.
- H₈ : The further the coordinating practice moves toward the administrative, highly specific agreement, the slower the rate of change and adoption of new practices, technology and product forms by market participants.
- H₉ : The greater the array or range of coordinating practices that are evidenced in a market, the greater the range in the degree to which equity obtains in that market.
- H₁₀ : The further that the coordinating practices move away from the spot-type transaction, the smaller the variance in equity that obtains over time.

Without much difficulty this list can be expanded. By attempting such a list I believe that we gain some tentative answers to the three questions posed at the beginning: 1) The basic conceptual framework appears to yield logically constructed hypothetical relationships relative to vertical behavior in markets. Such hypothetical relationships are intently appealing, at least to me. 2) The variables included seem to be relevant to the hypotheses gleaned from the conceptual framework. Many need greater refinement, both conceptually and empirically. 3) Many additional parameters need to be considered. Those put forth are, I believe, illustrative of the type of factor that leads to a tractable explanation of vertical market behavior. The list of hypothetical and testable relationships can be expanded signifi-

cantly as additional elements of vertical structure, coordinating practices and performance dimensions are delineated. The challenge is to identify more meaningful and comprehensive factors.

FOOTNOTES

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522. An earlier draft of this paper was prepared for the Subsector Task Forces of the Vertical Coordination subcommittee of NC-117, Chicago, Illinois, May 12, 1975. I'm indebted for the reviews, ideas and helpful comments I received from Victor Nyanteng, Robert Jacobson, Donald Larson, Dean Baldwin, Richard Kilmer, Bruce Marion, and James Shaffer.

- 1/ A stage within a subsector is a generally predominate grouping of functions into an enterprise or establishment. For example, in the beef subsector, major stages would include cow-calf units, growers, feedlots, packers, and the like. Implied is a vertical market structure between each tangential stage in a subsector.
- 2/ This is not to equate vertical conduct with cooperation. While cooperation between buyers and sellers may exist, it may not. Clearly, conflict can and often does arise in the negotiations or bargaining between buyers and sellers. Perhaps, the highly conflictive situations might be equated with painful bargaining while the cooperative situation, gainful.
- 3/ This is usually referred to as allocative efficiency, or the "efficiency" with which resources are allocated to their "best use". I find this to be a strange concept of efficiency -- what appears to be of concern is the "goodness" of the uses to which resources are allocated, or the accuracy with which resources are allocated in order to satisfy ultimate demand. Thus, my use of the term

"allocative accuracy".

4/ Some argue that this is simply a measure of pricing efficiency.

It may be, particularly if we define pricing efficiency as the accuracy with which price reflects economic contribution. Such a definition is clearly consistent with my partial definition of equity. However, it is important to recognize that, while pricing efficiency is often equated with allocative efficiency, they are not the same concepts, given this definition. As I have argued in the text, allocative decisions can and frequently do occur based upon nonprice or administrative criteria rather than upon price per se. Payment to the participants, an equity consideration, is almost always a function of price.

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